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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/854,924	05/14/2001	Toshihisa Yokoyama	782_163	7936

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EXAMINER

SONG, MATTHEW J

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 08/05/2002

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/854,924

Applicant(s)

YOKOYAMA ET AL.

Examiner

Matthew J Song

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____.

2a) ☐ This action is FINAL.

2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-26 is/are pending in the application.

4a) Of the above claim(s) 10-26 is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-9 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 14 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☒ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.6.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-9, drawn to a process, classified in class 117, subclass 11.
 - II. Claims 10-26, drawn to an apparatus, classified in class 117, subclass 200.
2. Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process, such as melting a raw material other an oxide.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Kevin Brown on 7/15/02 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-9. Affirmation of this election must be made by applicant in replying to this Office action. Claims 10-26 are

withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-2, 4, 6 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Imaeda et al (US 5,919,304).

Imaeda et al discloses melting a raw material of potassium carbonate, lithium carbonate and niobium oxide in an upper furnace at a temperature of 1100-1200°C and a lower furnace at a temperature of 500-1000°C (col 14, ln 45-67 and Fig 9). Imaeda et al also discloses a nozzle portion of a crucible, a driving mechanism for holding and moving a seed crystal and a mechanism for moving a grown oxide series single crystal (col 15, ln 1-14 and Fig 9). Imaeda et al also discloses at the time of seeding, a seed crystal is contacted to a surface of a melt at the lower end of a nozzle portion and a single crystal fiber was grown at a contact rate of 80 mm/hr by a mu pulling down method (col 15, ln 15-50 and col 17, ln 45-58). Imaeda et al also discloses a quality of a single crystal can be maintained by obtaining a single crystal under a gradual annealing of a low cooling rate of 100-400°C/hr.

Referring to claim 2, Imaeda et al discloses cooling, where cooling inherently removes ambient heat.

Referring to claim 4, Imaeda et al discloses a nozzle at the tip of a crucible.

Referring to claim 6, Imaeda et al discloses a fiber, this reads on applicant's planar form.

Referring to claim 8, Imaeda et al discloses a fiber, this reads on applicant's planar form.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3, 5, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imaeda et al (US 5,919,304) in view of Ciszek et al (US 4,075,055).

Imaeda et al teaches all of the limitations of claim 3, as discussed above in claim 1, except cooling the oxide single crystal by blowing a cooling medium thereto.

In a method of growing a crystal ribbon from a die, Ciszek et al teaches for wider ribbons of greater than 4 centimeters auxiliary cooling techniques are required to assure the desired temperature distribution across the crystal at the solid liquid interface during growth, where cooling is achieved by directing a flow of inert gas in different controlled amounts to different segments of the liquid solid crystal interface so as to maintain the desired growth temperature

across the growing body's interface. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Imaeda et al with Ciszek et al's cooling because larger ribbons are formed.

Referring to claim 5, the combination of Imaeda et al and Ciszek et al teaches a nozzle.

Referring to claims 7 and 9, the combination of Imaeda et al and Ciszek et al teaches a fiber, this reads on applicant's planar form.

9. Claims 3, 5, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imaeda et al (US 5,919,304) in view of Berkman et al (US 4,216,186).

Imaeda et al teaches all of the limitations of claim 3, as discussed above in claim 1, except cooling the oxide single crystal by blowing a cooling medium thereto.

Berkman et al disclose growing a crystal employing the edge defined film fed growth technique (EDFG) where cooling jets impinge on a susceptor **10** in close proximity and in non-incident relation with a ribbon crystal being formed (col 1, ln 55-67). Berkman et al also discloses a slit **20** which serves as a die through which a liquid silicon melt is drawn as a crystal **24** downward employing EDFG (col 2, ln 25-40 and Fig 2). Berkman et al also discloses a bore **48** serves as a conduit for a fluid coolant to be employed in stabilizing the growth of a ribbon crystal as it is pulled from the slit (col 3, ln 5-20). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Imaeda et al with Berkman et al's cooling because excessive strain due to the effects of thermal shock is avoided and stabilization of the ribbon growth is achieved (col 2, ln 1-10).

Referring to claim 5, the combination of Imaeda et al and Berkman et al teaches a nozzle.

Referring to claims 7 and 9, the combination of Imaeda et al and Berkman et al teaches a fiber, this reads on applicant's planar form.

10. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berkman et al (US 4,216,186) in view of Machida et al (US 5,431,124).

Berkman et al disclose growing a crystal employing the edge defined film fed growth technique (EDFG) where cooling jets impinge on a susceptor **10** in close proximity and in non-incident relation with a ribbon crystal being formed (col 1, ln 55-67). Berkman et al also discloses a slit **20** which serves as a die through which a liquid silicon melt is drawn as a crystal **24** downward employing EDFG (col 2, ln 25-40 and Fig 2). Berkman et al also discloses a bore **48** serves as a conduit for a fluid coolant to be employed in stabilizing the growth of a ribbon crystal as it is pulled from the slit (col 3, ln 5-20).

Berkman et al discloses pulling a crystal from a slit in an EDFG process. Berkman is silent a contacting a seed crystal to a melt of raw material. It is inherent to EDFG process to have a seed contact a melt, which is subsequently pulled to form a crystal.

Berkman et al teaches a crystal is pulled from a silicon melt. Berkman et al does not teach a raw material of an oxide single crystal.

In an Edge define film fed growth, Machida et al teaches an edge define film fed growth where a melt **2** is filled in a crucible incorporating a silt die **3** and is seeded with a seed crystal **5** and while cooled the melt is pulled (col 1, ln 25-40). Machida et al also teaches a rutile single crystal which is grown from a melt composed mainly of titanium dioxide from an Edge define film fed growth process (col 2, ln 20-40 and col 5, ln 25-45). It would have been obvious to a

person of ordinary skill in the art at the time of the invention to modify Berkman et al with Machida et al's melt of titanium oxide because it forms rutile single crystals useful as a polarizer material (col 1, ln 15-20).

Referring to claim 2, the combination of Berkman et al and Machida et al teaches cooling a susceptor in proximity to a growing crystal, this reads on removing ambient heat.

Referring to claim 3, the combination of Berkman et al and Machida et al teaches jets of cooling fluid.

Referring to claim 4-5, the combination of Berkman et al and Machida et al teaches a slit 20, this reads on applicant's nozzle portion.

Referring to claims 6-9, the combination of Berkman et al and Machida et al teaches a ribbon, this reads on applicant's planar form.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fukada et al (US 5,458,083) teaches an EFG process, where a seed crystal is contacted with a melt and pulled and pulling rutile, where rutile is an oxide single crystal (col 1, ln 20-55).

LaBelle, Jr. (US 3,953,174) teaches an EFG process where flat ribbons are produced from simple seed geometries (col 1, ln 15-30).

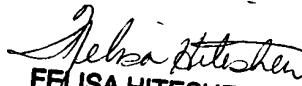
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on 703-308-3868. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song
Examiner
Art Unit 1765

mjs
July 30, 2002


FELISA HITESHEW
PRIMARY EXAMINER
AU 1765